

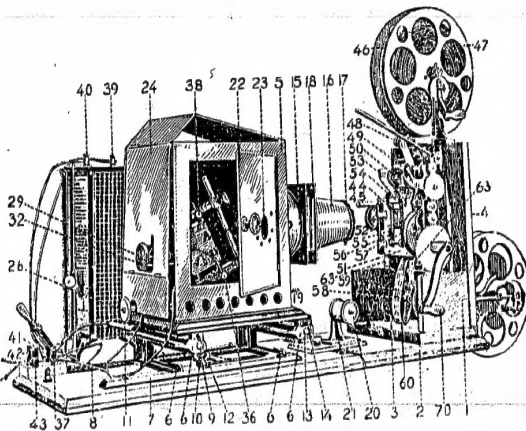
Form No. 107.

**INSTRUCTIONS**

For setting up and operating the

**Edison Projecting Kinetoscope****1901 Model****CONTENTS**

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## INSTRUCTIONS FOR SETTING UP THE EDISON PROJECTING KINETOSCOPE 1901 MODEL

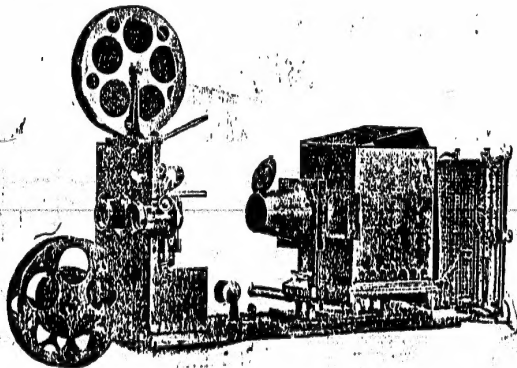
The Edison Projecting Kinetoscope comes packed in one case. The base board (2) is hinged in the middle for convenience in packing. Open the base board and place it on a firm table. The idler pulley (20) and casting (21) are next adjusted. Screw down the thumb bolt firmly. This makes the hinged base board as stiff as if it were one piece. This is important; as a perfectly rigid base board is necessary to keep the lenses in line after the adjustments are once made.

The Mechanism is all assembled in a quartered oak carrying case, (1). It is attached to the front end of the base board by inserting the two bolts from the under side of the base board and tightening with wing nuts (3).

The Objective Lens is then screwed into place on the front part of the cabinet (4). (As shown in cut-K-10, page-4).

The Lamp House (5), is next assembled. The lamp house casting (6-6-6) comes adjusted on the base board. It slides forward and back on the base board between the two lamp-house-casting-guides (7-8), and may be clamped into any position by the bolt and wing nut (9). The top part of this casting (6) is drilled front and back for the insertion of the slide rods. Rear slide rod (10-11) is next put into place from the left side of lamp house casting. (That is, from the opposite side of machine from which the operator usually stands). The end (10) is held firmly in place by set screw (12). The lamp house is now adjusted as follows: note that there are castings on the under side of base of lamp house. The rear castings are hooked and the front castings are drilled. Place the lamp house in position so that the hook castings rest on the rear slide rod (10-11). Now put the front slide rod (13) into place from the left side of the lamp house casting. This front slide rod (13) goes through the holes on the front lamp house base castings and is fastened securely with set screw (14). The lamp house should now slide freely to the left and right. To the left AWAY from the operating, towards the stereoscopic side of the machine.

and to the right, TOWARDS the operator and the moving picture side of the machine. The door (22) of the Lamp House has in it a ruby window (23), enabling the operator to see the light at all times without opening the door. The rear door (24) has apertures to permit all lamp adjusting knobs to be operated without opening it. While the lamp is being put into position, the door folds over the top of the Lamp House. The cut shows the Edison Projecting Arc Lamp in the Lamp House, with its adjusting knobs projecting through the rear door. The cut also shows the wiring for the electric current which will be taken up under the head of WIRING.



Cut No. K. 10.

—Rising front view of the Edison Projecting Kinetoscope, 1001 model, Rheostat on the right, light centered on Stereopticon lens which is shown adjusted to its position on the left hand side of the carrying case.

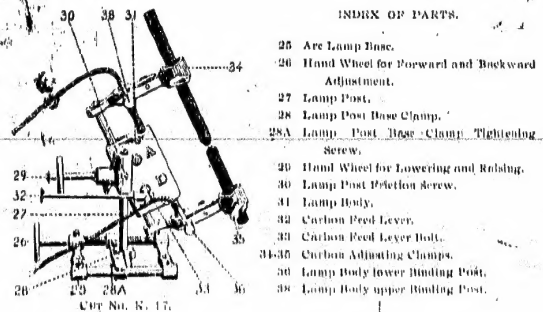
**The Condensing Lens** comes assembled in the holder (15), with the threaded ring OUT. This Russia iron holder combines also the hood (16), (with its mica lid (17)) and the slide carrier frame (18). Cut K 15 shows slide carrier in position in the frame. The other end of slide carrier projects through the slide carrier frame as shown in cut K 10.

**CAUTION.**—Should the condensing lens be removed from the holder, note particularly when it is put back, that the threaded ring must always be OUT, (NOT inside the holder).

To adjust the condensing lens in position in front of the Lamp House, slip the forked casting that projects from the Russia iron holder, over the bolt on the front of the Lamp House casting. The threaded ring on condenser comes into position INSIDE of the Lamp House. Now clamp firmly with thumb bolt (19). The lens and hood have now become a rigid part of the Lamp House, and slide with it to the left or right, opposite the stereopticon lens or the moving picture lens, according as the operator wishes to project stereopticon slides or moving pictures.

## THE LIGHT

### INDEX OF PARTS.



- 25 Arc Lamp Base.
- 26 Hand Wheel for Forward and Backward Adjustment.
- 27 Lamp Post.
- 28 Lamp Post Base Clamp.
- 28A Lamp Post Base Clamp Tightening Screw.
- 29 Hand Wheel for Lowering and Raising.
- 30 Lamp Post Position Screw.
- 31 Lamp Body.
- 32 Carbon Feed Lever.
- 33 Carbon Feed Lever Bolt.
- 34-35 Carbon Adjusting Clamps.
- 36 Lamp Body Lower Binding Post.
- 38 Lamp Body Upper Binding Post.

The interior of the Lamp House is planned for all lights known to exhibitors, including the electric arc light (both direct and Alternating), Oxy-hydrogen or lime light burners, saturators or Methyl-Ethyl burners and Acetylene burners.

**When electric current** is available, the Edison Projecting Arc Lamp is used. (See cut K. 17). The Arc Lamp base (25), comes screwed into position on the floor of the Lamp House with the hand wheel (26), to the left. This hand wheel (26) provides the necessary forward and back ad-

justment. The lamp post (27) is inserted in clamp (28) of base. The clamp is then tightened by the screw (28a), but it must not be too tight. The post must be loose enough to allow the necessary swing of the light to the right or left when this adjustment is necessary to find the center of the condenser. The hand wheel (29) lowers and raises the lamp. The screw (30) prevents the lamp body (31) from dropping by its own weight. This screw (30) should not be too tight or the hand wheel (29) will not raise the lamp or lower it. The lever (32) feeds the carbons. The lever bolt (33) is detachable (by unscrewing wing nut on back of lamp body) and is adjusted at D and A according to the current used. When the 110-120 volt Direct Current is used, the bolt (33) is inserted in hole D. When in this position the lever (32) feeds the top carbon twice as fast as the bottom carbon.

When the 52-104 volt Alternating Current is used, the bolt (33) is inserted in hole A. When in this position the lever (32) feeds both carbons at equal speed. The carbons are adjusted by clamps (34-35). The clamp arms are capable of a slight forward and back adjustment, by loosening the screw on the back of the clamp arm. This adjustment is necessary for the following reasons: When the D current is used the top carbon should be adjusted so that its point is about one quarter of an inch back of the lower carbon point. When the A current is used, the points should meet exactly.

**Wiring.** The binding post (36) on the lamp body, connects with switch binding post (37), (see cut K, 15), and the binding post (38) on the lamp body connects with rheostat binding post (39), (see cut K, 15 and also for the following numbered parts). The rheostat binding post (40) connects with switch binding post (41). The switch binding posts (42-43) are to take the main circuit wires and should be the last connected.

The main line should be wired for 110 volts direct current, or 52 volt or 104 volt alternating current, 25 to 30 amperes, using a standard 30 ampere cut out or double-pole switch with 30 ampere fuses in the main line.

If the operator has no electrical knowledge, we would suggest that he get an electrician to connect the line wire and lead same to the machine

in the first instance. Connect the line wire to the knife switch in binding posts (42-43), *always leaving the switch open.*

**Note.**—With the D Current, the top carbon should always be the positive pole. This is readily ascertained after the lamp is lighted, as the positive carbon becomes reddest, forms a crater and holds the red heat longest. Now if it happens that the lower carbon is the reddest, the wires at binding posts (42-43) should be reversed. This makes the top carbon the positive pole. With alternating current the lamp has no polarity.

**Lamp Adjustment.**—When the wires at posts (42-43) are connected the feed lever (32), (see cut K, 15) is either raised or lowered until the proper arc is obtained. Be sure that the Lamp House is brought to the right, (or towards the operator) as far as it will go. It is then in position to show the moving pictures. A perfect circle of white light should cover the film aperture (44). All this is done before the film is threaded into the mechanism. Should the circle of light on the aperture (44) be imperfect it may be remedied by either or all of the following adjustments: By swinging the lamp either to the left or to the right, (revolving on the lamp post) using the hand wheel (29) as a lever; or by raising or lowering the lamp by turning hand wheel (29); or by a forward and back adjustment by hand wheel (26).

**Note.**—The size of the circle covering the aperture (44) can be increased or diminished by sliding the entire Lamp House forward or back on the base board.

## SIX GOOD RULES

**FIRST RULE.** Adjust the height by raising or lowering the lamp on the lamp post (27) by the hand wheel (29), until the points of the carbons, when screwed together, are opposite the center of the condensing lens.

**SECOND RULE.** Turn on the current by closing knife switch. Lift up mica lid (17). The revolving mica shutter behind the framing plate should be turned so as to leave the space between the framing plate and the objective lens entirely clear.

**THIRD RULE.** The lamp should then be adjusted by moving backward or forward until a bright, clear, round light just covers the square

hole in the framing plate. If the circle of light is too large, light is lost and the sharpness of the picture is impaired. When properly adjusted, the light on the screen will be bright and free from color.

**FOURTH RULE.** The operator should adjust the objective lens by turning the focusing screw until the square on the screen is sharply defined.

**FIFTH RULE.** All this should be done before the film is adjusted.

**SIXTH RULE.** Never turn the light on the film until the film is in motion, and if by accident or mistake the film should stop while the light is on, shut mica lid (17) at once, or the film will catch fire.

**When Calcium (or oxy-hydrogen) light** is used by the operator, the Arc Lamp base (25) remains in position on the floor of Lamp House. Into the clamp (28) is inserted the eccentric-holder-post with which every Projecting Kinetoscope is equipped. The post must not be clamped too tightly; it must be loose enough to permit the eccentric holder to move to the right or left and forward or back, as may be necessary in centering the light on the condenser. The clamp screw may be tightened after center is found. The eccentric holder will accommodate not only the Edison oxy-hydrogen burner, but also any other jet in the market.

**Directions for Operating.** Remove jet from lantern to place lime pencil in straight position into lime cup within  $\frac{1}{4}$  inch from point of jet. It is important to have leather washers in couplings to prevent escape of gas.

Turn on the hydrogen gas (Black Cylinder) first until the flame becomes the size of a light from an ordinary gas burner. Then turn the oxygen gas (Red Cylinder) slowly until the light gets bright and dazzling. Too much oxygen dulls the light and may extinguish it; little red painted flames of hydrogen should always be noticed around the lime pencil. If not intense enough, add small portions of the gases until the light is nearly hissing. Turn off oxygen first and then hydrogen.

Do not have the lime pencil extend more than 15 inch above point of jet. Turn lime pencil about every few minutes to prevent cracking of condensers and see that no draught strikes the lantern.

If light snaps out, shut off both gases and relight as above stated.

Observe Rules 3, 4, 5 and 6 on pages 7 and 8.

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**When Acetylene Gas** is used the eccentric holder post will be found convenient in the adjustment of the burner. The use of this illuminant is recommended, only when the operator is thoroughly familiar with its generation. It will not be necessary to go into details in these pages as to its operation and burner adjustments, as these will be thoroughly understood by any one who already owns an Acetylene Outfit. Rules 3, 4, 5 and 6, on pages 7 and 8, must be carefully observed.

**The Saturator or Methyl-Etho Burner** is specially adapted for traveling exhibition purposes, and also for home use. The burner stands on the floor of the Lamp house, (the arc-light base being removed for this purpose). It stands between two rails, that are separated by just the width of the burner; thus holding it rigidly, but permitting a forward and back adjustment. A complete description of the Methyl-Etho Outfit, together with directions for generating the gas and adjusting the burner will be found under the heading Methyl-Etho Outfit, (see page 15). Rules 3, 4, 5 and 6, on pages 7 and 8, must be carefully observed.

## THREADING THE FILM

(See cut K. 15).

The film (46), is wound on the upper reel (47), by placing the end in the spring clip on the core of the reel. The emulsion side should be out. This operation is also described under the heading Film Winder. When the reel is wound direct from the take up device it should pass over the idler pulley (20). When the reel (46) is full the end of the film is brought over the lower front side of reel (as shown in cut K. 15). It passes over top idler (48), under top sprocket (49), over upper spring idler (50). Now open film gate (51). Be sure the mica shutter between the framing plate and the objective lens is so turned as to leave the space between the hole in the framing plate and the objective lens perfectly clear.

Engage the film on the intermittent sprocket (55), (the teeth of which just show through the slot in the film gate (51), leaving about  $\frac{3}{4}$  inches of the film slack. The gate (51), is then closed and latched, (52).

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This forces the slack film into a loop (53), as shown. The lower part of loop (53), passes behind the upper gate idler (54), as shown. The film is now between the framing plate and the film gate (51). As it passes the aperture (44), the film is held against the framing plate by the springs (56-57). This checks the momentum of the film and prevents the center of film from touching the gate, thus avoiding possibility of scratching.

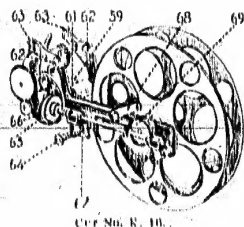
NOTE.—The emulsion side of the film should be always towards the light and the picture should show in the aperture upside down.

The film is now passed under the lower spring idler (58), and over the lower sprocket (59), leaving about eight inches of slack film which forms the lower loop (60), as shown. The purpose of these loops is to do away with pull on the film and consequent wear and tear and friction. The film is then passed under the last idler (61), (see cut K. 16), and under the take up reel core where it is slipped into the spring clip on the core. The film is now ready to run.

The mechanism is operated by the hand crank (70). The crank is turned up and away from the operator, and down and towards the operator, with a regular motion at a slow speed. Experience will very quickly determine this speed which will vary somewhat for different pictures.

**Framing Device.** As noted in instructions Threading the Film, there is no setting or adjusting of the film as it passes over the frame plate. This is rendered unnecessary by the framing device. After the picture appears on the screen, if it is not framed exactly, it is very easily accomplished by raising or lowering the lever (71), until the proper effect is obtained.

### TAKE UP DEVICE



Cut No. K. 10.

#### INDEX OF PARTS.

- 59 Lower Sprocket.
- 61 Last Idler Pulley.
- 62 Take-up Frame Hooks.
- 63 Take-up Frame Lugs.
- 64 Take-up Friction Adjusting Nut.
- 65 Take-up Friction Wheel.
- 66 Take-up Friction Disc.
- 67 Disengaging Lever.
- 68 Momentum Friction Spring.
- 69 Crown Gear.

10

This comes detached from the head piece mechanism, and is adjusted as follows: Insert the left hand part of the take up device, (see cut K. 16), through the hole in the lower part of the cabinet. The hooks (62) on the frame casting of the take up device hang on the half inch stud in the lower part of the head piece mechanism. The lugs (63) come into position (as shown, in cut K. 15). They are fastened into position with the two 8-32 machine screws. When the film has been threaded, as described, and fastened to the spring clip of the core of the take up reel, and the crank handle (70) is turned, the film will be wound on the reel as fast as it comes through the machine. If the reel does not revolve fast enough, the friction adjusting nut (64) should be screwed in, thus causing the friction wheel (65) to engage friction disc (66), causing the reel to revolve faster and taking up all the slack. The lever (67) is used to disengage the friction wheel (65), from the friction disc (66), and is only used when the film is re-wound from the take up reel to the top reel. When the film is re-winding, this lever (67) should be thrown back towards the reel. At all other times the handle of the lever should point outward. When the film is re-winding, use the friction spring (68), to check its momentum if it turns too fast. This is accomplished by pressing down the spring (68) until the end rubs against the inside of the crown gear (69). This spring (68) is only used when the film is re-winding. At all other times it should stand in position as indicated on cut K. 16.

### STEREOPTICON ATTACHMENT

The Stereopticon objective lens comes mounted in a ring casting, on one side of which is a drilled lug which slides on the rod (45), of the adjustable rod device. The lens may be clamped in position on the rod by means of the thumb screw on the lug. The adjustable rod device is fastened to the cabinet, in the position shown in cut K. 10, by means of the thumb screw, which is inserted from the front. The slotted arm of the rod device goes inside the cabinet and is clamped firmly by the round jamb nut on the end of thumb screw. The slotted arm has a wide adjustment up and down, or to the right and left. The drilled lug on the lens ring casting fits over the slide rod (45). The brass cup of the objective lens should always point towards the screen.

11

**Now Center the Light** and make all lamp adjustments for the Projecting Kinetoscope as described on page 7; this done, do not touch these adjustments again, but slide the lamp carefully to its new position in line with the stereopticon objective.

**To Adjust the Stereopticon,** raise or lower it by means of the slotted arm on the adjustable rod device. When in line with the condensing lens, clamp firmly into position with thumb bolt and round jam nut. Now slide the objective lens on the slide rod (45) toward or from the light as may be necessary. Then focus with focusing screw.

#### SPECIAL POINTS TO REMEMBER

*Don't change lamp adjustment after once centering the light as described in the six rules under the heading, The Light.*

*Always slide Lamp House carefully on sliding bars.*

All adjustments on the stereopticon must be made with the stereopticon objective and its fixtures, *not* with the lamp.

#### ADJUSTABLE RHEOSTAT

to connect the rheostat for use on 110 volt direct or 52 or 104 volt alternating current circuits, proceed as follows:

The two main wires are connected on switch binding posts (42-43) as shown in cut K. 15. One wire is then run from switch binding post (41) to binding post (40) on top of the rheostat. Another wire is then run from the other binding post (39) on top of the rheostat to binding post (38) on the lamp. Then a wire is run from the lamp binding post (36) to the switch binding post No. (37). This completes the circuit; simply running one side of the line through the rheostat. It matters not which side. The different currents are then controlled by the 'white sliding knob' on the rheostat, the amperage being increased by raising the knob and decreased by lowering the knob. For instance, if the 52 volt alternating current is used, the exhibitor requires less resistance than when the 110 volt direct or 104 volt alternating currents are used, and he would simply slide the knob nearer the top of the rheostat, throwing out of circuit the major portion of the German Silver wire with which the resistance is wound. If

the 104 volt alternating current is used, a little more resistance would be required. The sliding knob ordinarily would be about in the middle of the rheostat. If the 110 volt direct current is used it is often found necessary to use more resistance and the knob should ordinarily stand about one-third distance from the bottom of the rheostat. This may be determined by the amount of light the exhibitor wishes to procure upon the screen. In using any of the three above mentioned currents, more than forty amperes should not be used as it is liable to overheat the lamp and resistance. If the exhibitor is not using an ammeter he can usually determine when he is using too much current by the German Silver wire on the rheostat becoming red hot.

#### GENERAL INSTRUCTIONS

See that all set screws are kept tight, and the machine well oiled so that it runs smoothly and regularly at all times. Be careful not to use too much oil, as surplus oil is liable to spatter on the film, which is very ruinous.

Films should be handled carefully and kept clean and free from dust. They should be kept in their tin cases when not in use, and in a dry, cool place.

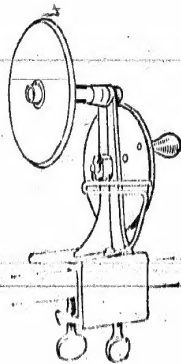
The films should be kept in perfect condition, any broken places being mended at once.

#### INSTRUCTIONS FOR USING EDISON FILM MENDER

First open all gates. Place one end of the film on left-hand side of repairer, emulsion side up, with the bottom line of picture as near the center of the glass as possible, then close and clamp left-hand gate over the film. Place the widest part of the gauge, which forms part of the repairing outfit, against the closed door, and holding it firmly on the film, take a sharp knife and cut off that portion of the film which projects beyond the gauge. Next, reverse the gauge, place it with the narrowest part over the film and close against the locked door, moistening that portion of the film which projects beyond the gauge, and scrape off the emulsion. For this use a moderately sharp knife. Be careful not to scrape away the celluloid. After this is done, open the gate and move back the

film so that it will be entirely covered by the gate, and re-lock the gate. Next, take the other end of the film, place it on the right-hand end of the repirer in the same manner as was done before, with the picture line as near the center of the glass as possible. Use the gauge in the same manner as before, that is, use the widest side and cut off that portion of the film which projects. This end of the film should not be moistened, nor should the emulsion be scraped away. After this is done, release the left-hand gate and place that end of the film in the same position as it was after the first operation had been performed. You will then note that the ends will overlap about  $\frac{1}{8}$  of an inch. Moisten both ends of the film with film cement where they overlap, cement the two ends together carefully and smoothly (the one with the emulsion scraped off underneath), close down the center door or gate and lock same securely. Leave the film in this position for from 20 to 30 seconds, when same will be thoroughly cemented together. When about to take the film from the repirer, open the centre gate first and if the film is found to adhere to same, there is a little side play. By working same carefully to the right and left the film will be released from the gate without breking the joint.

### FILM WINDER



Cut No. K. 20.

This ingenious little apparatus, (as shown in cut K. 20), is a great labor saver. It is small and compact and can be placed on any table or shelf that may be near the projecting machine, being provided with thumb screw for instantly adjusting it to a table. If a Kinetoscope is not equipped with a Take-up Reel, this Film Winder is an absolute necessity.

After the film has been run through the projecting machine the end is placed in the groove of the winding shaft with the emulsion side OUT; and by turning the crank of the winder slowly, a 100-foot film can be properly wound in less than ten seconds of time. There

is an attachment on the winder for removing the film from the shaft after it has been wound, in perfect safety and in a perfect roll.

This attachment consists of a nickel plated disc of about the diameter of a 150-foot film when rolled up. This disc slides from front to back of the shaft. After the film is wound, the exhibitor slides the disc from back to front carrying the roll of film with it, thus freeing it from the shaft.

### THE METHYL-ETHO LIGHT

The Methyl-Etho Light consists of a jet of oxygen, mixed with Methylated Ether, burning against a lime pencil. The operation of the light is very simple and in order to make it perfectly clear, the directions are given under three headings, as follows:

#### THE CHEMICALS.

#### THE OXYGEN GENERATOR.

#### THE METHYL-ETHO BURNER.

### THE NECESSARY CHEMICALS

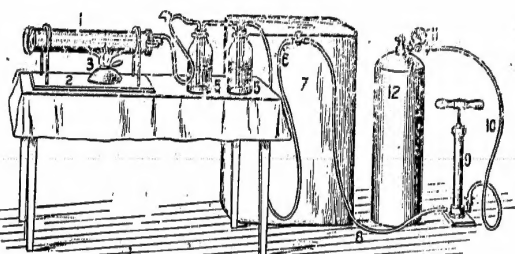
The necessary chemicals can be obtained in almost any large town if the supply purchased from us becomes exhausted. Buy the chemicals from a reliable druggist, and see that there are no chips or other combustibles mixed with the Chlorate of Potash or the Black Manganese. The following chemicals will suffice for 2 hours continuous running: 2 lbs. chlorate of potash, and  $\frac{1}{4}$  lb. black manganese, (in the retort (1), see cut K. 21);  $\frac{1}{4}$  lb. methylated ether (in the burner, cut K. 20) and 1 lime. (See L. cut K. 19).

Mix 4 parts of chlorate of potash and 1 part of black manganese thoroughly and distribute it equally along the entire length of the retort (1). Turn the retort so that the seam comes on top.

### THE OXYGEN GENERATOR

The oxygen generator. Fill the retort (1) as above. Connect the purifiers as shown in cut K. 21. The purifiers (3) should be half filled with pure water and  $\frac{1}{2}$  oz. of caustic soda, placed in bottle nearest the retort. Be careful that the ends of tubes AV are BELOW the surface of the water and the ends of tubes BB ABOVE the water.





Cut No. K, 21.

**Outfit No. 25.**

For generating Oxygen Gas into Gas Bag only.

- 1 1 Russia Iron retort and cleaner  $3\frac{1}{2} \times 18$ .....
- 2 1 Retort Stand.....
- 3 1 Burner (Gas or Spirit).....
- 4 10 inch lined Tubing from Retort to Purifier.....
- 5 2 Purifiers complete with rubber stoppers, glass and metal tubes....
- 6 6 ft. rubber tubing  $\frac{3}{4} \times \frac{5}{8}$  connecting purifiers and gas bag.....
- 7 1 55 gal. gas bag, stopcocks and regulator.....
- 8 6 ft. rubber tubing  $\frac{3}{4} \times \frac{1}{4}$  from gas bag to light.....

**Outfit No. 26.**

For Generating and Compressing Oxygen Gas.

- 1 1 Russia Iron retort and cleaner  $3\frac{1}{2} \times 18$ .....
- 2 1 Retort Stand.....
- 3 1 Burner (Gas or Spirit).....
- 4 10 inch lined Tubing from Retort to Purifier.....
- 5 2 complete Purifiers with rubber stoppers, glass and metal tubes....
- 6 6 ft. rubber tubing  $\frac{3}{4} \times \frac{5}{8}$  connecting purifiers and gas bag.....
- 7 1 55 gal. gas bag & double stopcock.....
- 8 6 ft. rubber tubing  $\frac{3}{4} \times \frac{5}{8}$  from gas bag to pump.....
- 9 1 compressor.....
- 10 5 ft. lined tubing and couplings from compressor to cylinder.....
- 11 1 gauge attachment, regulator and 5 ft tubing to light.....
- 12 1 25 ft cylinder and key.....

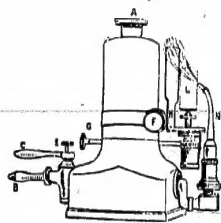
The Gas Bag (7) should be rolled before connecting to eject all air. Place the burner (3) on retort stand (2) at one end of the retort (1). Gas will generate as soon as heat is applied. Allow a little oxygen to be given off, before finally connecting the retort (1) with the tubing (4) to the first purifier (5). To ascertain when the gas is pure, light a piece of brown paper, *then blow it out*, and hold the *smoldering* portion in front of the arm of the retort (1). When the gas is pure, the paper will burst into flame; then connect with tube (4) and see that all the tubes are straight. Now open the tap of the gas bag (7). Scores of people forget to do this. The gas bag (7) is now filling with pure oxygen gas. Move

the burner (3) along under the retort (1) inch by inch until the elements are exhausted. As soon as the bag is quite full, remove the burner from the retort, turn off the tap at gas bag and disconnect the tubing.

When using the gas bag a pressure of 150 to 200 pounds is required to procure best results, which is obtained by means of press boards and weights. The capacity of the gas bag is 55 gallons, and about 2 lbs. of chemicals must be used to fill it completely.

The gas bag should be kept in a warm place when not in use. Wash out the retort with hot water as soon as possible, and do not attempt to pick out the baked residue with a chisel or other sharp instrument, as this spoils the retort. Don't leave mixture to harden; unless the retort is cleaned at once, it is almost impossible to remove the hardened residue.

When outfit No. 26, is used, the oxygen gas is compressed into cylinder (12) with compressor (9) until about 100 lbs. pressure is reached in cylinder (12).

**THE METHYL-ETHO BURNER****INDEX OF PARTS.**

Cut No. K, 10.

- A.—Brass cap over Methyl-Etho feeding cap.
- B.—Oxygen inlet nozzle.
- C.—Tap regulating supply of oxygen.
- D.—Nipple check nut.
- E.—Oxygen regulating valve.
- F.—Clamp band tightener.
- G.—Line adjuster.
- H.—Light shield.
- I.—Lime.
- N.—Nipple.

**To charge the Apparatus.** This must not be done in close proximity to gas or lamp light. See that the tap (C) is in line with the inlet nozzle (B), as in illustration. Unscrew the brass cap (A), which is fixed in the feeding cap. Put in very gently, to avoid spilling on the burner, about 4 ozs. of Methylated Ether "730" or "735". Screw the cap tightly on again. The apparatus may then be lighted up, but it is preferable to allow the charge to stand an hour or two before using.

**To light up.** Attach the rubber tube from the bag to the inlet nozzle (B), with the handle in line with the nozzle, as in illustration. See that the small regulating valve (E), which is in the tap (C), is unscrewed a few turns. Fix the lime (L), on the pin as shown. To obtain the best results, the lime should almost touch the nipple of the jet. Then turn on the gas at the bag gradually to a good pressure, so as to insure the liquid being forced through the passages of the burner, and out of the nipple.

Apply your hand to the nipple (N), and when there are no indications of moisture it is ready for lighting.

Adjust the pressure from the bag so as to give a small light. When the light is obtained, increase the pressure from the bag until the flame rises above the shield, somewhat as shown in the illustration, and just on the hissing point. Do not be afraid of a large flame. Now turn the tap (C) gently to the right (never to the left). This admits pure oxygen to the nipple, and the flame will subside to a bright incandescent spot, with no trace of yellowness.

**Charge running out.** A 4 oz. charge will last on an average of at least two hours, but if by any chance it appears to be getting exhausted, bring back the tap (C) gradually a little way towards the inlet nozzle and watch for any improvement of the light. As a rule an extra half hour can be gained in this way.

**Spitting,** flickering or unevenness of the light is a sure indication that the apparatus has been overcharged. This would work off in time; but oxygen blown through at a high pressure, or a large flame allowed to burn for a few minutes, will clear off the surplus.

**Popping** is a sure indication either that the oxygen is nearly exhausted, or that the charge is running low, but it may also be caused by low pressure at the cylinder. Keep up as good a pressure of oxygen as the jet will stand without hissing. (Attention to these two points will obviate all difficulties).

**Re-charging.** If the apparatus has been formerly charged with 4 ozs. and used only (say) an hour, it should not be fully charged on the next occasion, as this would cause flickering (see preceding page). Calculate 2 ozs. of ether per hour burnt.

**To Adjust the Lime.** The lime arrangement is made so that it can be easily adjusted to any lantern, by simply unscrewing the clamp band (F), you can raise or lower it at will; and to adjust the nipple (N) unscrew the check nut (D) at foot, turn around the nipple—it will rise or fall as desired; when you have found the proper position you may lock it again with the same check nut, and it will remain fixed as long as required. Remember! Once the light is centered, it is right for almost all future occasions.

**To turn out the Light.** Move the tap (C) very gently to the right, until it is parallel with the body of the burner, at the same time turning the hot spot on the lime away from the nipple. Finally close the valve at the cylinder. The tap (C) should be left against the body of the Saturator.

**General Remarks.** Ether often loses strength by exposure, and in order to secure the best results, it may be sometimes found necessary to clean out the old liquid; this can easily be done by adding fresh liquid and then thoroughly blowing it through. Afterwards re-charge as at first directed.

All burners are tested and charged when sent out. Try the light without re-charging the first time.